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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,289	07/29/2003	Govind Sharan Gupta	KNS0002-US	5388

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EXAMINER	
FERRIS III, FRED O	

ART UNIT	PAPER NUMBER
2128	

DATE MAILED: 08/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/628,289	GUPTA, GOVIND SHARAN	
	Examiner	Art Unit	
	Fred Ferris	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/3/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-7 have been presented for examination based on applicant's disclosure filed 29 July 2003. Claims 1-7 are currently pending in this application and stand rejected by the examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-4 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to independent claim 1, there are a number of issues that that appear to render the claim indefinite. First, the preamble of claim 1 recites determining the cavity size in packed bed systems using correlation or mathematical model. However, it is unclear from the language of the claim specifically how correlation is used in determining cavity size. (See: 101 rejection below) Second, the claim language recites, "using mathematical equations based on correlation", but the equation variables in the body of the claim are undefined again rendering the claim indefinite. The examiner notes that dependent claims 5 and 6 include the definition of each variable. For clarity, claims 1 and 4 should likewise include variable definitions. Third, claim 4 references equation 29, but equation 29 does not appear in the preceding claims

and therefor lacks antecedent basis. Dependent claims inherit the defect of the claims from which they depend.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-7 are rejected under 35 U.S.C. 101 because the claimed invention is drawn to non-statutory subject matter.

Per claims 1-7: The Examiner submits that, in view of the language of the claims, method claim 1, for example, merely recites a and abstract mathematical construct and does not appear to recite a tangible result. In this case the result appears to merely be a calculated numerical representation of the recited method steps. The examiner submits that in order to establish a practical application, there must be either a physical transformation, or a useful, concrete and tangible result. Data transformation is not the same as a physical transformation. In this instance, there does not appear to be a tangible result. Here, the result of calculating the cavity size using the cavity radius is simply a mathematical computation resulting in an un-stored and un-applied number, not a physical transformation. Hence the claimed "calculating" is simply a thought or computation, and not in and of itself a tangible result. It is not until the result of the calculation is applied in a meaningful way that it has real world value and becomes a tangible result. e.g., storing the result of calculating, or using the

calculated result to determine the cavity size in packed bed system as recited in the preamble.

MPEP 2106 recites the following supporting rationale:

"A. Identify and Understand Any Practical Application Asserted for the Invention
The claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and ***tangible result****." State Street, 149 F.3d at 1373, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of* ***"real world" value****, as opposed to subject that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96); In re Ziegler, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)). Accordingly, a complete disclosure should contain some indication of the practical application for the claimed invention, i.e., why the applicant believes the claimed invention is useful.*
Apart from the utility requirement of 35 U.S.C. 101, usefulness under the patent eligibility standard requires significant functionality to be present to satisfy the useful result aspect of the practical application requirement. See Arrhythmia, 958 F.2d at 1057, 22 USPQ2d at 1036. Merely claiming nonfunctional descriptive material stored in a computer-readable medium does not make the invention eligible for patenting. For example, a claim directed to a word processing file stored on a disk may satisfy the utility requirement of 35 U.S.C. 101 since the information stored may have some "real world" value. However, the mere fact that the claim may satisfy the utility requirement of 35 U.S.C. 101 does not mean that a useful result is achieved under the practical application requirement. The claimed invention as a whole must produce a "useful, concrete and tangible" result to have a practical application.
Although the courts have yet to define the terms useful, concrete, and tangible in the context of the practical application requirement for purposes of these guidelines, the following examples illustrate claimed inventions that have a practical application because they produce useful, concrete, and tangible result:
- Claims drawn to a long-distance telephone billing process containing mathematical algorithms were held to be directed to patentable subject matter because "the claimed process applies the Boolean principle to produce a useful, concrete, ***tangible result*** *without pre-empting other uses of the mathematical principle." AT &T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 1358, 50 USPQ2d 1447, 1452 (Fed. Cir. 1999);*
- "[T]ransformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces a useful, concrete and tangible result' -- a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades." State Street, 149 F.3d at 1373, 47 USPQ2d at 1601; and
- Claims drawn to a rasterizer for converting discrete waveform data samples into anti-aliased pixel illumination intensity data to be displayed on a display means were held to be directed to patentable subject matter since the claims defined "a specific machine to produce a useful, concrete, and ***tangible result****." In re Alappat, 33 F.3d 1526, 1544, 31 USPQ2d 1545, 1557 (Fed. Cir. 1994).*
A process that consists solely of the manipulation of an abstract idea is not concrete or tangible. See In re Warmerdam, 33 F.3d 1354, 1360, 31 USPQ2d 1754, 1759 (Fed. Cir. 1994). See also Schrader, 22 F.3d at 295, 30 USPQ2d at 1459. Office personnel have the burden to establish a prima facie case that the claimed invention as a whole is

directed to solely an abstract idea or to manipulation of abstract ideas or does not produce a useful result. Only when the claim is devoid of any limitation to a practical application in the technological arts should it be rejected under 35 U.S.C. 101. Compare ***Musgrave, 431 F.2d at 893, 167 USPQ at 289; In re Foster, 438 F.2d 1011, 1013, 169***
USPQ 99, 101 (CCPA 1971). Further, when such a rejection is made, Office personnel must expressly state how the language of the claims has been interpreted to support the rejection."

Dependent claims inherit the defect of the claims from which they depend.

Claim Rejections - 35 USC § 102/103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-7 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over "Particle-scale modeling of gas-solid flow in Fluidization", Yu et al, Journal of Chemical Technology and Biotechnology, October 2002.

Regarding independent claim 1: Yu teaches blast furnace mathematical modeling design method for packed bed systems inclusive of, obtaining data related to material properties of the packed bed (Sections 1, 2, 4.3, Fig. 2), calculating the cavity size as a function of increasing gas velocity and decreasing gas velocity using mathematical model (equations, 2.0-3.3), and stresses/frictional forces and raceway hysteresis (Sections 3.0-3.2, Tabs.1, 2).

In the alternative, claim 1 is rejected under 103(a) since a skilled artisan would have knowingly used correlation between increasing and decreasing gas velocity in determining the cavity size by calculating the cavity size using the cavity radius, since the prior art teaches that raceway size increases gas velocity (Sections 3.3), and that the cavity becomes unstable as a function of the shape of the curve (Section 3.2, Fig. 2). An obvious motivation exists since cavity instability would need to be avoided in order to balance the bed weight (Sections 3.1, 3.2).

Regarding dependent claims 2-4 and 7: Yu teaches material properties of the packed bed including bed height, tuyere opening, void fraction, wall-particle friction coefficient, inter-particle frictional coefficient, gas velocity, model width and particle shape factor (Sections 1-3.3, 4.3, Fig. 2), and friction forces (Sections 3.0-3.2, Tabs.1, 2) relating to blast furnaces.

5. Claims 1-7 are further rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over "Numerical simulation of the gas-solid flow in bed with lateral gas blasting", Xu et al, Power Technology 109, Elsevier Science 2000.

Regarding independent claim 1: Xu teaches blast furnace mathematical modeling design method for packed bed systems inclusive of, obtaining data related to material properties of the packed bed (Sections 2.0-2.3.2, 4.1-4.3), calculating the cavity size as a function of increasing gas velocity and decreasing

gas velocity using mathematical model (Sections 2.0-2.3.2), stresses/frictional forces and raceway hysteresis (Sections 4.1-4.4),

In the alternative, claim 1 is rejected under 103(a) since a skilled artisan would have knowingly used correlation between increasing and decreasing gas velocity in determining the cavity size by calculating the cavity size using the cavity radius since the prior art teaches that raceway size increases gas velocity (Sections 4.1-4.4, page 17, col. 1, para:2, Fig. 2) and that the cavity becomes unstable as a function of the shape of the curve (page 17, col. 2, para:1, Fig. 2). An obvious motivation exists since cavity instability would need to be avoided in order to balance the bed weight (Sections 4.1-4.4, page 17, col.2, para: 2)

Regarding dependent claims 2-4 and 7: Xu teaches material properties of the packed bed including bed height, tuyere opening, void fraction, wall-particle friction coefficient, inter-particle frictional coefficient, gas velocity, model width and particle shape factor (Sections 3.0-4.3), and friction forces (sections 2-3.1) relating to blast furnaces.

Allowable Subject Matter

6. Claims 5 and 6 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and assuming issues relating to 35 USC 101 and 112(2) rejection can be resolved. In this instance, the prior art does not explicitly disclose determining cavity radius by velocity

correlation for finding the dimensionless numbers as specifically recited in the disclosed equations.

Conclusion

7. The prior art made of record not relied upon is considered pertinent to applicant's disclosure, careful consideration should be given prior to applicant's response to this Office Action.

US Patent 5,223,908 issued to Scott et al teaches modeling of blast furnace raceway parameters.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Ferris whose telephone number is 571-272-3778 and whose normal working hours are 8:30am to 5:00pm Monday to Friday. Any inquiry of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is 571-272-3700. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached at 571-272-2279. The Official Fax Number is: (571) 272 8300

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